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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,825	03/22/2004	John D. Bass	02307V-133910US	4243

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EXAMINER

MCDONOUGH, JAMES E

ART UNIT	PAPER NUMBER
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1755

MAIL DATE	DELIVERY MODE
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05/24/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/806,825

Applicant(s)

BASS ET AL.

Examiner

James E. McDonough

Art Unit

1755

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2007.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 and 50-73 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-48 and 50-73 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1755

DETAILED ACTION

Original Rejection

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 56-58, 62, 63, 65, 66, 70 and 72 are rejected under 35 U.S.C. 102(e) as being anticipated by Markowitz et al., USP 6,660,780 (hereafter referred to as Markowitz) (note ancestry data).

Markowitz discloses the invention as claimed (col. 11, 1. 62 to col. 12, 1. 9).

Claims 1-9, 11, 12, 16, 17, 20-22, 34, 35, 40, 42, 56-58, 62, 63, 65-67, 70 and 72 are rejected under 35 U.S.C. 102(b) as being anticipated by Katz and Davis, Nature, vol. 403, 20 January 2000, pp. 286-289 (hereafter referred to as Katz).

Katz discloses the invention as claimed (figure 1; p. 289 "Procedures for imprint cleavage").

Claims 34, 35, 38-40, 42, 56-58, 62-70 and 72 are rejected under 35 U.S.C. 102(b) as being anticipated by Davis et al., Chem. Mater. 1996, vol. 8, pp. 1820-1830 (hereafter referred to as Davis).

Davis discloses the invention as claimed (p. 1830, figure 13, structure 9; p. 1832, figure 15).

Claims 1, 2, 4-9, 11, 12, 17, 20, 34-37, 39, 40, 56-58, 62, 63, 65-67, 69, 70 and 72 are rejected under 35 U.S.C. 102(a) as being anticipated by Ki et al., J. Am. Chem. Soc., vol. 124, 2002, pp. 14838-14839 (hereafter referred to as Ki).

Claims 56-58, 60-63, 65-67, 70, 72 and 73 are rejected under 35 U.S.C. 102(b) as being anticipated by Dai et al., Angew. Chem. Int. Ed. Engl., 1999, vol. 38, no. 9, pp. 1235-1239 (hereafter referred to as Dai I).

Dai I discloses the invention as claimed (p. 1236, left column, middle sections; figure 2).

Claims 56-58, 60-63, 65-67 and 69-73 are rejected under 35 U.S.C. 102(b) as being anticipated by Dai et al., USP 6,251,280 (hereafter referred to as Dai II).

Dai II discloses the invention as claimed (figure 1A, top left three ligands; figure 1B, bottom four ligands; col. 9, 1. 27 to bottom; col. 11, structures).

Art Unit: 1755

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 10, 13-15 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katz as cited above.

The disclosure of Katz has been discussed above.

Katz lacks explicit disclosure that the inorganic oxide may have a planar surface or that the thermolysis may occur at higher temperatures. However, it is conventional in the art to have planar inorganic oxide surfaces, and it would have been well within the skill of the routineer in the art to perform the thermolysis step at an elevated temperature.

It would have been obvious to one of ordinary skill in the art to apply that skill to the disclosure of Katz with a reasonable expectation of obtaining a highly-useful method

Art Unit: 1755

of making an inorganic oxide imprinted with functional groups and the oxide itself with the expected benefit of the oxide being processable at a range of temperatures depending on the temperature required to cleave the linking group.

Claims 18, 19, 23-27, 30-33, 41, 43-55 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katz in view of Dai II as cited above.

The disclosure of Katz has been discussed above.

Katz lacks explicit disclosure that a mixture of different ligands may be used to imprint the inorganic oxide. However, Dai II teaches that a variety of such ligands may be used for this purpose (col. 9, 1. 27 to col. 10, 1. 8).

It would have been obvious to one of ordinary skill in the art to apply the teaching of Dai II to the disclosure of Katz with a reasonable expectation of obtaining a highly-useful method of making an imprinted inorganic oxide material and the material itself with the expected benefit of the material having more than one species of binding surface.

Response to Arguments

Applicants argue that the Markowitz reference does not teach imprinting of Functional moieties and do not disclose imprinting in an ordered fashion on a bulk oxide. However, this is not persuasive because Markowitz describes a reference that is incorporated by reference for the "Synthesis of Highly Ordered, Three-Dimensional,

Art Unit: 1755

Macroporous Structures of Amorphous or Crystalline Inorganic Oxides,..." (column 3, lines 65-68).

Applicants argue that the Markowitz reference does not disclose the production of a bulk inorganic oxide having a plurality of voids, each having a plurality of amine groups imprinted. However, this is found not persuasive because Markowitz does teach making a bulk inorganic oxide that has voids with amine attached (column 11, line 62 to column 12, line 9).

In addition, applicants argue that Markowitz lacks four or more functional groups. However, it should be apparent that in a bulk material there would indeed be more than four such functional groups, though they may not necessarily be of the same type of functional group. Furthermore, since TEOS is used, there surely would be surface hydroxyl functional groups.

Applicants argue that the reference of Katz does not disclose thermal deprotection. However, this is found not persuasive because Katz clearly teaches thermal deprotection (page 289, paragraph 3, under procedures for imprint cleavage).

Applicants argue that the examiners assertion that the use of three different temperatures implies three different functional groups is wrong. However, this is not persuasive because the first paragraph of the reference clearly states " Here we describe imprinting of bulk amorphous silicas with aromatics rings carrying up to three... side groups" The different temperature ranges correspond to the different imprinting molecules used and the number of side groups on the imprinting molecule.

Art Unit: 1755

Applicants argue their claims 62, 63, 65-67, 70, and 72 all call for four or more functional groups, but Katz only has three. However, this is not persuasive because claim 62 requires that the substrate contain four or more groups not the templating agent.

Applicants argue that Davis does not disclose the use of four or more functional groups. However, this is not persuasive because as stated above the claim calls for four or more functional groups on the substrate not the templating agent.

Applicants argue that their composition has hydrophilic groups. However, looking at figure 15 one can clearly see that there are indeed hydrophilic groups on the composition of Davis.

Applicants argue that Davis can only imprint three groups because the imprinting molecule is based on benzene. This is not persuasive because benzene can have up to 6 functional groups and is not limited to only three groups as asserted by the applicants. Furthermore the claims require that there be four or more groups on the substrate not the templating agent.

Applicants argue that Ki could not produce an imprinted bulk product, but had to settle for a surface imprinted product and refer to the last paragraph on the right side of page 14838. However, this is not persuasive because the examiner could not find this statement in this paragraph.

Applicants argue that Ki does not produce a product that has at least four imprinted groups. However, as stated above the claims call for the substrate having four or more groups not the templating agent.

Applicants also argue that Ki only teaches a single functional group. This is found not persuasive because in figures 3 and 4 Ki clearly discloses more than one functional group.

Applicants argue that Dai I only imprint the surface and not bulk oxides. This is found not persuasive because the sentence actually pointed out (first sentence, middle paragraph, page 1236) that the surface of the pores are coated, which would place them in the bulk material contrary to the applicants assertion that they are only on the outer surface.

Applicants argue that their claims call for imprinting with four or more functional groups. This is found not persuasive because looking at figure 2 we can clearly see that there are four functional nitrogen groups in side of the pore, furthermore, the claims call for the four or more functional groups to be on the substrate and not the templating agent as stated above.

Applicants argue that Dai II only surface, not bulk, imprinting. This is not persuasive because the claims do not call for bulk imprinting vs. surface imprinting, however, as stated above the surface of the pores are coated, which, puts the functional groups inside the bulk material.

Applicants argue that Dai II only imprints with single imprinting moieties having a single functional group per moiety. This is found not persuasive because 1.) the examiner points to figures 1A and 2A not figure 3 2.) the claims require the multiple functional groups to be on the substrate not the templating agent 3.) in figures 1A and 2a it is clearly seen that there are ligands used with four or more functional groups, actually BSSAPTS and BSSSAPTS have five functional groups.

Applicants argue that Katz is limited to a chemical deprotection using chlorotrimethyl silane. This is found not persuasive because under the section "procedures for imprint cleavage" the examiner can find no mention of chlorotrimethyl silane, furthermore, the reference clearly teaches that temperature is used to cleave the imprinting molecules (thermal deprotection), and that increasing temperature is used as there are more groups, which, would have made it obvious to increase the temperature in going from three to four groups, and someone of ordinary skill in the art at the time the invention was made would have been able to easily determine the optimal temperature for deprotection through routine experimentation.

Applicants argue that neither Katz nor Dai II teach the use of multiple types of imprinting functional groups. This is found not persuasive because Dai II teaches that more than one analyte can be removed from a mixture by using more than one functional group in the solid material in a series (column 6, lines 49-64).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to James E. McDonough whose telephone number is (571)272-6398. The examiner can normally be reached on 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571)272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1755

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JEM 5/22/2007


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SUPERVISORY PATENT EXAMINER